MILL SECTION of

Concrete

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The Problem of Change

INDUSTRY is constantly confronted with the problem of change—change in demand; change in production methods; change in marketing methods and, sometimes, even change in the characteristics of the product itself.

Faced with this ever-present possibility, it is only natural that there should be a tendency to withdraw from change—and in some cases to ignore the tendencies that indicate the need for change. Sometimes it seems easier to change the demand than to change the product to meet a new demand.

The cement industry is not exempt from this inevitable trend. Just as in all other industries, the fortunes of the cement industry move in cycles. There was the development period when cement manufacturers in the United States struggled to gain a market for American portland cements. Then came the period of quantity production when builders clamored for cement and more cement and the production capacity of the mills was unequal to the demand. With this demand came also a period of expansion when new mills were built and old mills were enlarged.

The rapid growth of demand left little time for the manufacturer to study his product from the viewpoint of the user. His problem was a production problem and that occupied his attention. The question of the quality of the product was taken care of by a standard specification that, for a time at least, seemed to satisfy the user.

But the problem of change was again forced into the foreground by a series of structural-concrete failures and, with the revision of the specifications that followed, came a new angle in the production problem. While the changes seemed slight to the user, they necessitated marked changes in plant operation in many of the mills and brought forth the largest crop of fine grinding machinery in the history of the industry. The newer production cycle had come, in which a higher quality product brought with it the need for a reduction of operating costs.

There are indications of further change. A second slight revision of the standard specifications seems not to have met the new demands fully. Attention is again focused on quality and performance in the field. Slowly but surely a change in the requirements of the user are being crystallized into a changed demand.

The industry is moving in its cycle. Sales, production—changed demand, sales, changed product, new production methods—a newer changed demand, newer sales methods and—— Will the cycle again be completed with further changes in the product and still newer manufacturing processes?

It is the opinion of some men, prominent in the industry that the cycle will again be completed. Change is inevitable, but it must come about in an orderly manner—as an evolution rather than a revolution.

From its inception, the cement industry has faced and met the problem of change. Its history indicates that it will not now ignore or attempt to escape this ever-present problem.

Safety in Cement Mills

THE reasons for the remarkable record in accident prevention enjoyed by the portland cement industry in the United States were plainly evident at the cement section meeting of the National Safety Council, recently held in Detroit. When men get together and display such enthusiasm for their work as did the safety men who attended the session, there is only one result possible.

These men feel that they are doing a worthwhile work—that it is worthy of their best efforts. They constantly talk and practice safety and are not content to confine their efforts to the men in the mills. They even go to the trouble of holding general meetings for the purpose of preaching the need for safety precautions and instructing others in the principles of safety. Through the experience and the convictions gained in the cement mills, they feel it necessary to pass the safety message on to those not within the industry.

Every man that has been trained in safety work and is convinced of its value is an influence for safety in his community. He will practice it also in the hours that he is not at the plant and will tell his family of its value. In this way the industry is not only helping itself by keeping down accidents but it is also contributing something of value to the public at large.

Plant of the Colorado Portland Cement Company Nears Completion

A Complete Description of the New Plant, Named After the President of The Colorado Portland Cement Company—Dry Process Is Employed—Will Have Capacity of 3,600 Barrels per Day

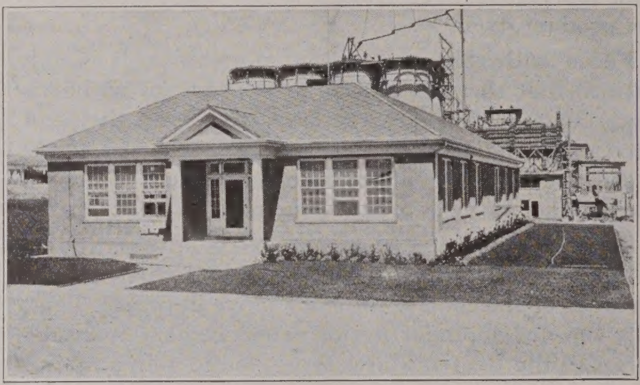
THE Ideal Cement Company of Denver, Colo., which is the holding company for the Colorado Portland Cement Company, Portland, Colo., the Oklahoma Portland Cement Company, Ada, Okla., the United States Portland Cement Company, Concrete, Colo., the Nebraska Cement Company, Superior, Neb., the Union Portland Cement Company, Devil's Slide, Utah, and the Three Forks Portland Cement Company at Trident and Hanover, Mont., is building a new and strictly modern plant at Boettcher, Colo., which is located 7½ miles northwest of Fort Collins. The new plant is named after the president of the company, Mr. Charles Boettcher.

While not so large as one other of the company's properties, it is the last word in model cement plants and incorporates every mechanical facility that will insure efficient quality production. The plant was designed and is being built by Paul C. Van Zandt, an engineer of international reputation. For seven years, from 1916 to 1923, Mr. Van Zandt was chief engineer of the Asano Portland Cement Company, in which capacity he built a number of plants that extend the length of the Japanese empire.

Location

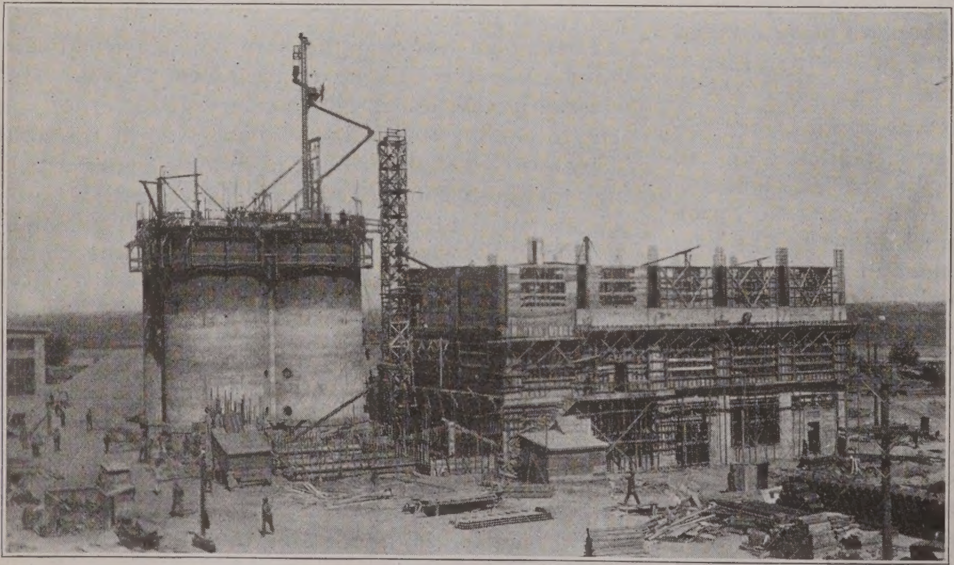
The new plant, which operates as the Colorado Portland Cement Company, is approximately 70 miles north of Denver, and 7½ miles from Fort Collins, where the 300 men now employed in building the plant are able to procure all the necessities and conveniences. This proximity will be likewise advantageous to the 150 men required to run the plant after its completion.

With the Rocky Mountains for a background, the plant is picturesquely located near the Cache la Pondre River, at a point where it emerges from its mountain canyon. Approaching, it makes an impressive picture, the eight rock storage bins on one side and the 12 cement storage bins on the other side, rising symmetrically on either side of the plant proper. As though to exemplify the artistic possibilities of the material which the plant will produce, particular care has been taken to procure a smooth, flawless surface on the monolithic concrete structures of the plant.

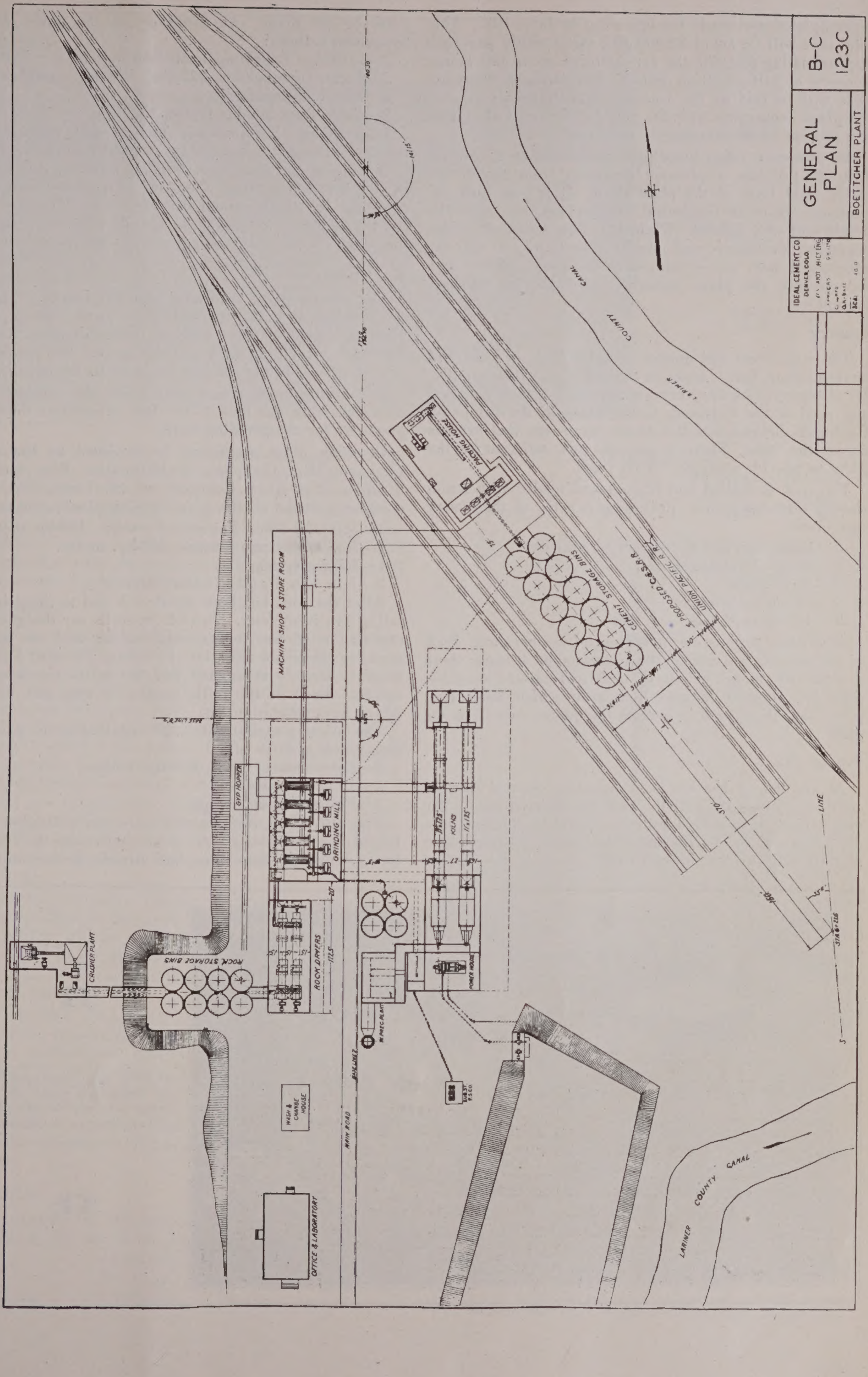


The plant office

By gauging the stages of construction with the advance of the seasons, it will be possible to continue work through the winter months and it is expected that the plant will



The power house and the correction tanks


B-C
123C
GENERAL PLAN
BOETTCHER PLANT
IDEAL CEMENT CO.
DENVER, COLO.
LARIMER COUNTY CANAL
UNION PACIFIC R.R.
PROPOSED C.&S.R.R.
CEMENT STORAGE BINS
PACKING HOUSE
MACHINE SHOP & STORE ROOM
GYP HOPPER
GRINDING MILL
KILNS
ROCK DRYERS
ROCK STORAGE BINS
CRUSHER PLANT
POWER HOUSE
MAIN ROAD
WASH & CHANGE HOUSE
OFFICE & LABORATORY
BASE LINE
LINE
LARIMER COUNTY CANAL

be completed and ready for operation in July, 1927. The total cost will be about $2,000,000, the monthly pay roll approximating $40,000, the expenditures up to date being in excess of half a million dollars. Two miles of 90-pound rails will be laid by the Union Pacific Railroad to give the plant connection with the road at Flavin, Colo. The dry process of manufacture is employed.

An attractive office building, constructed at a cost of $20,000, provides a pleasant deviation from the necessarily rigid lines of the plant itself. It is also built of concrete. It is of residential architecture, one story in height and well lighted. While it is now tenanted by the engineers, draftsmen and construction heads, it will be rearranged later to accommodate the plant officers and the chemist, the plans including an elaborate, modern laboratory.

Quarry

The rock from the quarry samples high in lime and analyses show that it makes a cement of excellent quality. Its characteristics are very similar to the rock quarried and used at the Portland, Colo., plant of the company. Geologists believe that this is the same vein that extends across the state. There is enough rock adjacent to the plant to provide a supply for 60 years.

The rock is drilled and blasted and loaded with steam shovels into dump cars. Following is a list of the quarry equipment:

1—Large 125 Electric shovel on crawlers.
1—Model 70 steam shovel.
2—Well drills.
3—18-ton locomotives.
20—10-ton yard cars.

At present there is one steam shovel in operation. Both of the shovels are not of the electric type because there is a limited amount of outside electrical current available until the plant is in operation, after which waste heat power will be utilized to operate the quarry as well as the plant.

Power Plant

At this date it has not been definitely decided whether coal or natural gas will be used for kiln burning. The power plant is equipped with two 1,000 hp. boilers, supplying steam for a 5,000-kilowatt turbo-generator which in turn will furnish power to the motors in the various parts of the plant. An inventory of the power house equipment follows:

2—1,000-hp. EdgeMoor waste-heat boilers.
2—Foster superheaters, 225 lbs., 150 deg. superheat.
2—Foster economizers.
2—Green fans, 200-hp. motors.
1—5,000-kw. Westinghouse turbine and surface condensor connected to the Public Service Company's lines.

Outside of the waste-heat boilers, which are furnished by the EdgeMoor Iron Company, the power house is equipped by the Westinghouse Electric & Mfg. Co. turbine, condensors, switchboards and all motors throughout the plant. A sub-station is adjacent to the power house.

Raw End

The crusher plant is located near the quarry. From it, the crushed rock is conveyed to the rock storage bins. There are eight of these, each 25 feet in diameter and 63 feet high, providing rock storage against the possibility of a shutdown in the crusher house or in the quarry.

The drying room comes next where the crushed rock conveyed from the bins to the two cylindrical dryers is prepared for the grinding mills.

Crushing plant machinery is furnished by the Allis-Chalmers Mfg. Company of Milwaukee, Wis., and the Williams Pulverizer Company of St. Louis, Mo. The machinery in the crushing and drying plants consists of:

1—36-in. by 60-in. Fairmount crusher, 150-hp. motor.
1—No. 9 Williams crusher, 250-hp. motor.
1—Mixing system.
2—7 ft. 6 in. by 70 ft. rotary dryers.

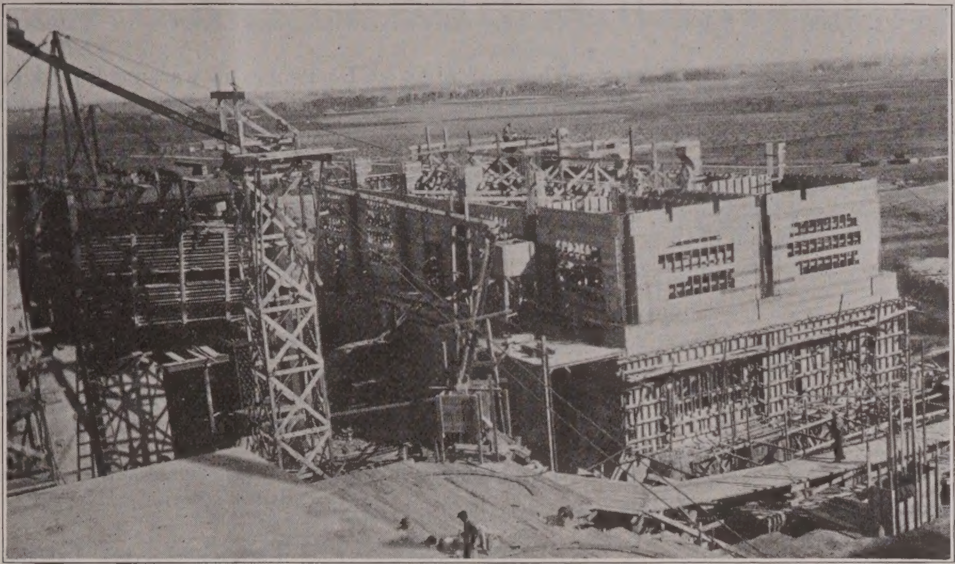
After the rock has been dried, it is fed to the grinding mills, five in number. Two of the mills are designed for crushing rock, two for grinding clinker and one can be used for either raw material or clinker. The mill building itself is already completed and the mills are being installed. Each of the mills weighs 75 tons and will be driven by a 600-hp. motor.

The primary equipment to be installed in the grinding department consists of:

5—Compartment mills, 600-hp. motors.
1—100-kw. exciter set.
2—Fuller-Kinyon pumps.

The pulverized raw materials are stored in four reinforced concrete bins of the same dimensions as the rock bins. Work on these bins has already been completed.

Showing the construction of the connection tanks. In the background are the kiln piers. One dryer is in position



The power house, showing the installation of the waste-heat boilers

Slip forms were used in the construction of the bins. Day and night shifts were employed, the concrete being poured continuously for 24 hours a day for 6 days. Four crews, each engaged in a different phase of the work at the same time, coordinated in the erection of the bins. One crew placed the concrete, another the steel, a third manipulated the jacks that raise the forms and the fourth finished the surface as the forms climbed to the top.

Finish End

From these bins, which also serve as correction bins, the raw mix goes to the two 11 ft. by 175 ft. kilns driven by 75-hp. motors. Leaving the kilns, the clinker passes through the two 7 ft. by 70 ft. cylindrical coolers, installed in the kiln room, from which it is conveyed to the bins over the finish grinding mills previously described. Gypsum is added at this point. Kilns, coolers, dryers and grinding mills are furnished by the Traylor Engineering & Manufacturing Company, of Allentown, Pa.

There are 12 bins for storing finished cement. These are of slightly greater size than the other storage bins, being 30 ft. in diameter and 80 ft. high. They are located near the pack house and adjacent to the loading spur of the railway.

Fuller-Kinyon pumps convey the finished cement from the storage bins to the pack house in which four 3-tube Bates packers will be installed. A continuous bag cleaner will be used in the sack department.

A 12-ton industrial gasoline Crawler crane is used in the plant yards.

The machine shop, always an important accessory because of the tremendous wear that machinery in a cement plant is continuously subjected to, has been completed and much of the equipment has already been purchased. It was made large enough so that storage room is afforded for carrying stocks of repair equipment and supplies. Because of the constant demand upon the machine shop by the other departments, it has been placed as centrally as possible.

Capacities

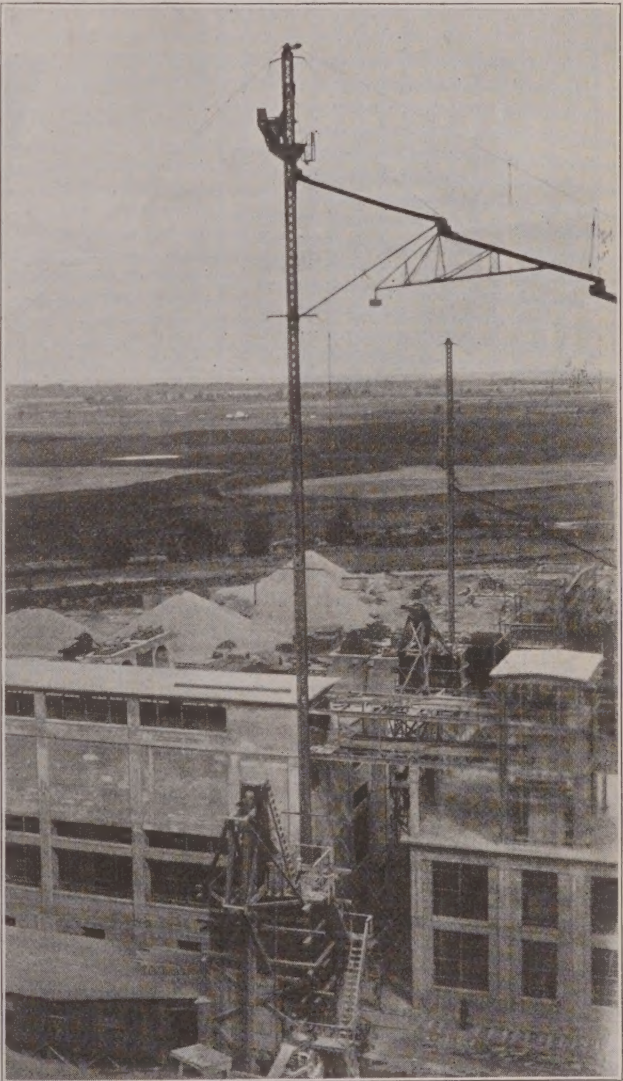
The capacity of the new mill and the quantities of materials it will use in the plant are listed below:

CAPACITY (Barrels)

	Per Year	Per Month	Per Day
Cement	1,100,000	100,000	3,600

QUANTITIES (Tons)

	Per Year	Per Month	Per Day
Rock	380,000	33,000	1,200
Gypsum	6,000	560	20



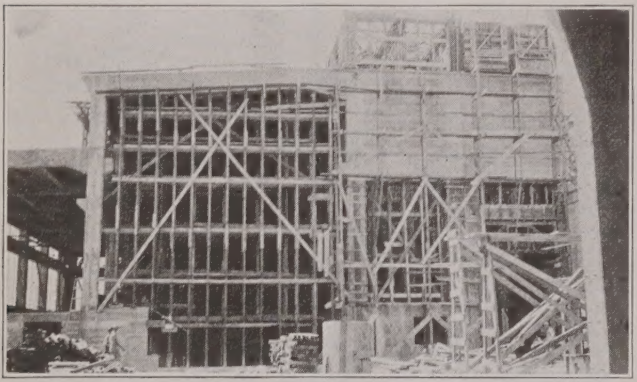
A 160-ft. Insley tower was used to place the concrete in the mill building, the dryer building and the rock storage bins.

	M Cu. Ft.	M Cu. Ft.	M Cu. Ft.
Gas (if used)	1,650,000	150,000	5,400
	Cu. Ft.		
Water	4,400,000		
	K.W.H.	K.W.H.	K.W.H.
Power	19,800,000	1,800,000	3,000

STORAGE	
Rock	9,200 tons
Raw mix	4,500 tons
Cement	200,000 bbls.
Gypsum	150 tons

History of the Company

The Ideal Cement Company, because of its initiative and enterprise, has become one of the West's leading enterprises. Organized in 1899 under the name of the Colorado Portland Cement Company, it began in a small way with a plant at Portland, Colo. This is said to be the first cement plant built in the West. Its remarkable growth can be attributed to the high type of men in the organization and to the constructive policies of the company. With the inadequate machinery at their disposal in those early days, the company strove to turn out a product of the best quality and this has been the aim of the organization ever since. With implicit confidence in this miracle-working material, little known and seldom used west of the Mississippi in the early part of this century, these men of vision built and planned for a new structural era.



North elevation of the compeb mill building, with the mill room and motor room on the left

The small group of rough buildings that comprised the first plant at Portland, Colo., and the modern, giant plant now being completed at Boettcher, are representative of the progress of the industry.

Today the Ideal Cement Company controls the following list of plants:

		Daily Capacity
Ada, Okla., 2 plants	(combined)	6,000 bbls.
Portland, Colo.		3,000 bbls.
Concrete, Colo.		2,200 bbls.
Hanover, Mont.		2,250 bbls.
Trident, Mont.		3,000 bbls.
Superior, Neb.		2,500 bbls.
Devil's Slide, Utah		2,000 bbls.

Personnel

The guiding genius of the organization from the day of its inception is Mr. Charles Boettcher, who has been continuously at the helm as its president, during its entire existence. Other officers of the company are: R. J. Morse, vice-president. Mr. Morse, who is a cement plant executive of unusual experience and ability, is also the general manager of the holding company and holds the same position in all of the operating companies. Much of the success of the organization is due to his efforts. C. K. Boettcher, vice-president, and Harry C. James, vice-president.

The new plant at Boettcher, as was mentioned before, was designed and is being built under the direction of Paul C. Van Zandt, chief engineer of the company. Associated with Mr. Van Zandt is a staff of engineers of unusual ability in the cement field. They are: J. F. Kaufman, assistant engineer, in charge of the drafting room; Clark F. Leh, mechanical engineer; L. S. Schuch, electrical engineer; G. Lutz, structural engineer; Arthur Hill, mechanical engineer; and J. E. Griffith, superintendent of construction who has built other plants for the Ideal Company as well as for other companies.

Supervised by these experienced men, the work of completing the plant is progressing according to schedule. The plant will be completed and ready for operation about July, 1927.

(Additional illustrations of this plant will be shown in the January issue.)

Report Extensive Deposits of Gypsum

Extensive deposits of gypsum are reported in the Province of Victoria in Australia by the official analyst of the Department of Agriculture in the Province of Victoria. Two varieties of gypsum are said to be of common occurrence. They are "selenite," a clear crystal, and "satin spar," a fine, fibrous variety.

The deposit was first operated on a commercial scale at Boort, Victoria. It is in the bed of a dry lake adjoining the railway station and well situated for economical development. It has been worked for more than 25 years and is still yielding gypsum of good quality. For more than 20 years, it has been used on a small scale as a soil ameliorant but its use has not become general owing to the small quantity exploited.

Other fields in active operation are found at Tempy on the Mildura line, Red Cliffs near Mildura, Manangatang and Cowangie, all near rail or water transportation. No overburden exists on these deposits. While the lake or lagoon deposits are the only ones exploited at present, there are beds of gypsum throughout Mallee with a foot or two of overburden in which the gypsum content varies from 49.8 to 99.6 per cent.

Cement in Japan

Tokyo, Japan, July 9.—Word from New York that negotiations are in progress for the flotation of a $50,000,000 loan to the city of Tokyo for reconstruction purposes has embued the cement manufacturing companies of Japan with a feeling of optimism. Permanent reconstruction has been held up owing to lack of funds and there are between 200 and 300 bridges in Tokyo alone which will be made of reinforced concrete. Moreover, the city has laid plans for loaning money at low rates of interest to builders through the Reconstruction Building Company, so that many business structures will undoubtedly get under way if the loan goes through.

Financial observers here declare that it is almost certain to do so, as they see signs that a New York syndicate has been buying up Japanese securities in Wall Street to prepare for the additional financing.

Another large consumer of cement will be the Tokyo Subway Company, which is now engaged in the construction of a system which eventually will be 50 miles long.

There are now 29 cement factories in the country. They have a productive capacity of about 1,600,000 barrels a month. Those which are members of the Japan Cement Association have been operating under an agreement which limits production by 38 per cent of capacity.

Power Plant and Kiln Design and Operation

A Series of Articles on the Combined Processes of Power Plant and Kiln Operation, Considered as a Unit

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AND

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Chapter III.—Instruments and Methods of Control

Some Considerations in the Selection and Operation of Recording Instruments in Cement Mills—Meters are Valuable Indicators of Factors Vital to Efficient Operation—Types of Instruments—Some Sample Charts and an Analysis of Their Records

THREE elements are necessary to obtain the maximum results in the recovery of the heat from the waste gases from the kilns. The proper equipment should be carefully selected to recover the heat. This equipment should be placed in the hands of a well trained organization capable of operating it at its maximum recovery and maintaining it in first class condition. Suitable instruments must be provided to enable the operating forces to visualize conditions at the various stages throughout the plant at all times.

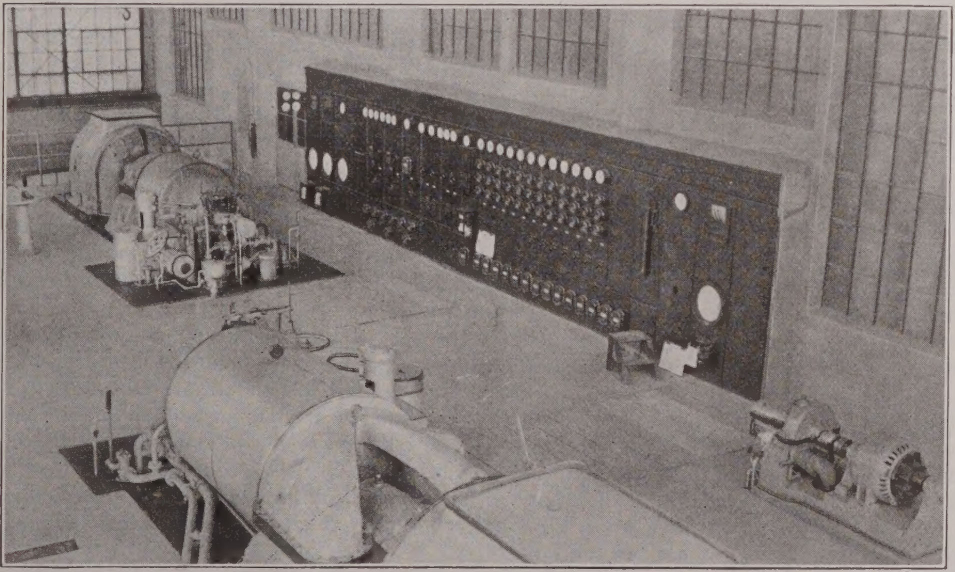
Excellent equipment may attain mediocre results in the hands of poorly trained operators. An operating force well grounded in the basic principles may obtain fairly good results with very few instruments to assist them. The maximum recovery, however, can only be obtained with the combination of good equipment, a well trained force and a proper selection of instruments whose records are co-ordinated and followed.

Instruments and meters of the various types necessary to indicate and record the factors vital to the operation of the component parts of the equipment at their maximum capacity are thus essential. Only by the constant study and use of such data may the operating forces produce a maximum of power with a minimum expenditure for equipment and fuel.

The data obtained on various parts of the equipment must be correlated and compared at regular intervals. The summarized results will then be of considerable value in comparing results under varying conditions and in checking operating efficiencies from time to time.

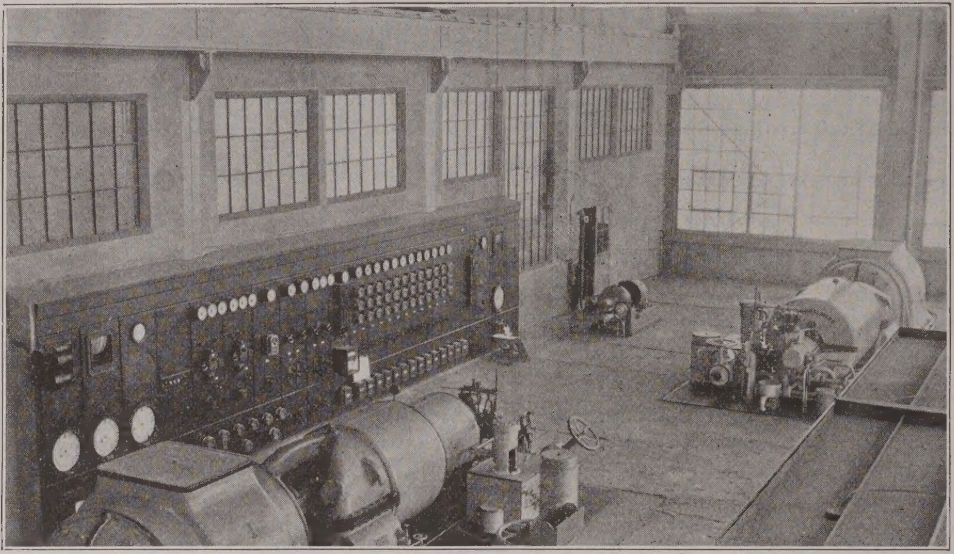
Types of Instruments

Indicating instruments are satisfactory for some purposes. Graphic meters are preferable where the trend of conditions must be watched or where the simultaneous effects at various points are to be compared. Where defi-



The turbine room and switchboard in a modern cement plant nite quantities of flow are to be measured, the integrated results are necessary.

The problem of selecting instrument types is sometimes difficult. Many times indicating instruments are selected on their lower price where a comparison of the charts from graphic instruments would reveal important relationship between the results which may be overlooked with the indicating instruments. The value of the permanent record in checking the results obtained by different operators and different conditions and the value in allowing the operator to follow alterations in adjustment will frequently offset the difference in cost.



The records on the instrument board tell the story of power consumption in each department of the mill

One of the most important requirements in the selection of instruments is the initial accuracy and the ability to maintain this accuracy in service. Indifferent indications are worthless and unless the readings are reasonably correct, they become merely figures which are worthless for any purpose.

Meters require inspection and checking and should receive similar maintenance attention to that accorded other apparatus in the plant. The operators should be made familiar with the maintenance and calibration of all instruments in the plant as well as the interpretation of the results. It is sometimes difficult to overcome the feeling on the part of the workman that the instruments are a form of mechanical detective. The best way to overcome this feeling is to have the operating forces work up the results. This requires considerable educational work but the increased interest and the increase in plant economy will more than repay the effort.

The successful recovery and use of the waste heat involves the close co-operation of the several mill departments. The amount of fuel burned, the draft, the temperature of the gases, and the composition of the gases at the kiln exit should be entirely under the direction of the burner, and will vary with the amount and composition of the raw material. The generation of steam from the hot gases and its conversion to power are under the direction of the power department. It will thus be observed that the power department will have no control over the amount of heat delivered to the boilers. The load on the generators must thus be regulated to suit the amount of steam generated. The co-operation of the grinding departments is thus essential. The grinding departments must be ready at all times to increase or decrease the load upon signal from the power department. Some storage in the various stages and excess grinding equipment are thus necessary in the mill departments to take care of power fluctuations. The seasonal storage should be carried as finished cement rather than as clinker. Thus a large storage of finished cement is required. These features are justified on other grounds also.

The metering equipment may be divided into several classes. Certain equipment is necessary for the accurate control of the combustion in the kilns, some for the proper operation of the boilers, and some for measuring the quantities produced and checking the general results.

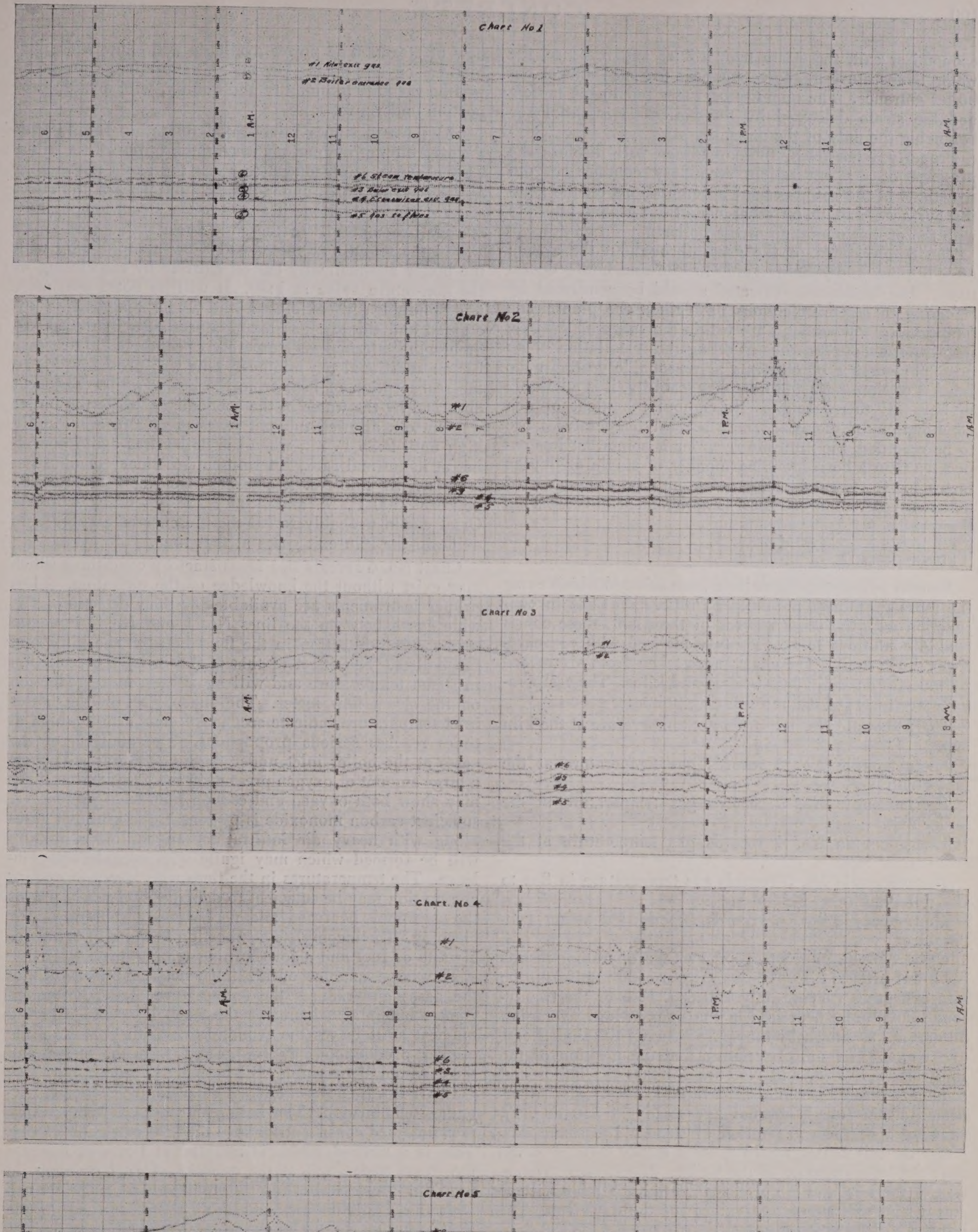
Controlling Gas Temperatures

The governing factors for controlling the burning in the kilns may be closely followed if we know the draft at the kiln exit and the temperature and composition of the exit gases. The draft, once fixed for a given output of a kiln, should be maintained approximately constant. Any deviation from this figure indicates abnormal conditions which should be corrected. The Ellison or one of the indicating gauges reading to hundredths of an inch will be suitable for this purpose. The long piping necessary to bring the indications to the burning floor are apt to become choked with dust. Provision should be made for blowing them with compressed air at intervals to insure correct readings.

The temperature of the gases is best indicated by means of thermocouples and pyrometers. The electrical wiring may be readily carried to the burning floor and the meter conveniently located for the burner. The graphic meter is probably best for this purpose, although the indicating meter is frequently used.

The Orsat apparatus should be the primary equipment for analyzing the gases. The CO_2 recorder is available in various forms but does not tell the whole story. It must be calibrated by means of the Orsat and frequent Orsat readings should be taken as a check, even though the operations are governed by the CO_2 recorder. The effect of excess air or incomplete combustion has a serious effect upon kiln fuel economy as well as upon the heat recovery in the boilers.

The readings necessary for the proper boiler operation are the draft, temperature and composition of the gases at the kiln exit, the boiler entrance, the boiler exit and the



Some typical pyrometer charts. The records are analyzed in the accompanying text economizer exit, the steam temperature and pressure, the water temperature at the economizer entrance and at the boiler entrance. The quantity of water fed to the boilers and the steam delivered by the boilers is essential for balancing the duty of the units.

Properly interpreted, these readings will disclose the presence of air infilltration, secondary combustion, obstructions in the gas passages, accumulations on the heating surfaces, and many other conditions which interfere with the proper operation of the boilers.

The temperatures of the gases throughout the system offer a quick and reliable guide to kiln and boiler operations. The tendencies indicated should be confirmed by referring to other indications throughout the plant. The temperatures encountered are within the range of the base metal thermocouples, thus enabling the installation of an adequate number of elements at reasonable cost. In the interest of simplicity and interchangeability, it is advisable to have all thermocouples throughout the plant of one combination of metals. Where several temperatures are to be recorded, the multiple recorder is somewhat less expensive than a corresponding number of single or duplex instruments. The advantage of grouping a number of affiliated records on one sheet is appreciated in comparing the results.

Typical Charts

Several pyrometer charts have been selected which cover the more prominent points to be observed. Used in conjunction with the other records of the plant, these charts enable conditions to be readily visualized with comparatively little study. The charts were taken from six record pyrometers on individual boilers and kilns. The temperatures are recorded at the following points:

Thermocouple No. 1 records gas temperature at the kiln exit.

Thermocouple No. 2 records gas temperature at the boiler entrance.

Thermocouple No. 3 records gas temperature at the boiler exit.

Thermocouple No. 4 records gas temperature at the economizer exit.

Thermocouple No. 5 records gas temperature in flue to Cottrell Plant.

Thermocouple No. 6 records superheated steam temperature.

Chart No. 1 represents good average operating results for a wet process kiln. The temperatures are uniform, the kiln exit gases varying only 100 deg. F. over the twenty-four hours. The heat loss in the flues is low, averaging 50 deg. F., as shown by the space between the lines No. 1 and No. 2. The uniform nature and the position of the lines No. 3, No. 4, and No. 5 show that the boiler and economizer are absorbing all available heat. The superheated steam line is normal and steady at 550 deg. F., showing a uniform generation of steam. The steam flow meter on this boiler would show a steady flow of steam near the rated capacity of the boiler. The clinker production of the kiln and the electrical power available will be steady and will show high values for the day's run. The clinker will be uniformly well burned.

Chart No. 2 shows the effect of irregular kiln operation with abrupt changes in the fuel and the slurry feed. The exit gas temperatures are irregular and the average low. The temperature of the gases leaving the boiler and economizer are low and show considerable fluctuation, indicating that the boiler at times is operating far below rating. The superheated steam temperature is low, rarely reaching 500 deg. F. The boiler is thus absorbing what heat is available but will not produce a steady or an adequate flow of steam. The power available will show wide fluctuations on the steam flow meter. The clinker produced will be variable in quantity and quality, with a large proportion underburned.

Chart No. 3 shows fairly good operating results with the exception of the periods when the fire was off the kilns. This chart was introduced to show the rapid changes in the gas temperatures under these conditions and the effect upon steam generation. The sag in the steam temperature is very pronounced. In the shut down starting at 12:30 P. M., the steam flow meter will show a rapid drop with the boiler automatically cut off entirely by the closing of the non-return valve at 1:30. It will be noted that after the non-return valve closed, the steam temperature increased and the exit gas temperatures also increased, although the entrance gas temperatures continued to decrease for an additional ten minutes. This was probably due to the reabsorption of heat from the boiler walls. The heat absorbed by the water in the economizer, while the boiler was cut off, allowed the exit gases to remain abnormally high until 2:25 P. M., when the boiler was again operating at its normal rate. Intermittent secondary combustion is shown by line No. 2 crossing line No. 1 at intervals between 7:00 P. M. and 3:00 A. M. A check with the Orsat would probably reveal the presence of carbon monoxide in the kiln exit gases at that time.

Chart No. 4 reveals two unsatisfactory conditions which may exist without the knowledge of the operators, unless proper instruments are available for their detection. The wide space between the lines No. 1 and No. 2 indicates serious air infiltration in the flues between the kilns and the boilers. The effect of this is shown by the reduction in steam temperature and will show even more reduction on the steam flow meter. The sharp rises in the boiler inlet temperature indicate secondary combustion which at times reaches serious proportions. The analysis of the gases at the boiler inlet under these conditions will show a large amount of oxygen present, in the gases and at times may show both oxygen and carbon monoxide present. If sufficient carbon monoxide is present in the kiln exit gases along with heavy air infiltration, an explosive mixture will be formed which may ignite with considerable violence. The temperatures in the flues with heavy secondary combustion may be sufficient to damage the brick work, or the dust may be fused and necessitate a shut down for cleaning. The incomplete combustion in the kiln evidences a waste of fuel and a low burning temperature.

The large amount of air introduced not only dilutes the gases and reduces the temperature at the boiler entrance, but it also increases the stack losses by carrying off heat as it leaves the economizer. With excess air the clinker production may be normal with the steam and thus the power available will be below normal.

Chart No. 5 shows the effect of sustained moderate secondary combustion. The boiler entrance gas temperature is maintained consistently above the kiln exit temperature. This is a method which is adopted at times to increase the steam generation at the expense of fuel economy in the kiln. More coal is fed to the kiln than can be burned with the available air, and the balance burned in the flues. Caution should be exercised in using this method as disastrous results are easily obtained with uncontrolled secondary combustion.

On this chart the effect of operating the soot blowers may be noted on the boiler and economizer exit gas temperatures. The sharp drop followed by the gradual rise at 8:50 A. M., 4:00 P. M., and at 11:45 P. M., indicates the operation of the blowers followed by the gradual fouling of the heating surfaces.

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Cement and Quarry Men Discuss Safety

Helpful Papers and Enthusiastic Discussions Feature Fifteenth Annual Safety Congress at Detroit

"THE accident statistics of the cement industry are the very best that come to my office."

That statement, made by Ethelbert Stewart, United States Commissioner of Labor Statistics, at the meeting of the Cement Section of the Fifteenth Annual Safety Congress, held in Detroit, October 25 to 29, indicated the zeal of the men responsible for the work of preventing accidents in the cement industry. The enthusiasm and the earnestness with which the men charged with this responsibility discussed safety measures and "swapped" experiences at this meeting indicated further that the statistics so conscientiously gathered were the material upon which the cement men based their campaign to eliminate accidents from the industry.

The session was attended by more than 100 representatives of cement mills from plants scattered over the length and breadth of the country. An interesting bit of the history of accident prevention work in the cement industry was brought out in the meeting and it showed the progress made in this work within a few short years. Ten years ago the second meeting of the Cement Section of the Safety Congress was also held in Detroit. There were 14 men present—and six of these were on the program! G. S. Brown, president of the Alpha Portland Cement Company, presided. Now, ten years later, Mr. Brown was again present and his interesting paper, in which he presents some recollections of that early meeting and tells of "Accident Prevention from the Viewpoint of the Executive," is published in full in another page of this issue.

Cement Section

The Cement Section of the Congress met on Tuesday morning, October 26. Though the program listed this as only a morning meeting, the discussion grew so enthusiastic that it was necessary to reconvene the meeting after lunch and it continued well into the afternoon. Russell Frame, insurance manager of the Alpha Portland Cement Company, presided with his usual enthusiasm and ability to make everyone anxious to take part in the discussions. Some interesting facts were brought out in the report of the secretary, Mr. H. G. Jacobsen, which was the first contribution. All through the discussions "Jake" was called upon from time to time and gave freely of his knowledge and experience in accident prevention work. Mr. Jacobsen told of the work of the Bureau of Accident Prevention and Insurance of the Portland Cement Association and of the success of the many sectional meetings held at various locations through the year. As an indication of the effectiveness of this work he said that accidents in cement mills had been reduced to 40 per cent since 1920—an inspiring record and one that indicated the possibilities for the future. The universal interest now evidenced in the work and the favorable record so far during 1926 prompted him to predict that 1926 was going to be the champion of all previous years.

There was an echo, also of the remarkable records in accident prevention made by the Duluth plant of the Universal and Ontario plant of the Canada companies for which trophies were awarded at the spring meeting of the Association in New York. The men responsible for these records were present and were asked to give accounts of the means by which they achieved such results. Both representatives — Mr. MacDonald for Canada and Mr. Huth for Universal—emphasized the need of educating the men in accident prevention as the main reason for a full no-accident year.

New Officers

New officers of the Cement Section, nominated by the committee of which Major Reninger was chairmen were: For chairman, Russell Frame (Alpha); for vice chairman, Tom Halpin (Marquette). The committee also recommended that the retiring chairman become a permanent member of the executive committee. The nominees were unanimously elected by acclamation.

Papers Presented

Two of the papers presented at the session are published in full in this issue—"Accident Prevention from the Viewpoint of the Executives," by G. S. Brown (Alpha), and "The Relationship Between Physical Examination and Accident Prevention," by E. T. Green (Riverside).

The other paper, "A Year's Experience With a Borrowed Plan," read by E. H. Parry (Glens Falls), will be published in a later issue.

Discussions of these papers were interesting and spontaneous. One after another the safety men from the mills got to their feet and either contributed some new thought to the paper or asked and answered questions. Such subjects as bonuses for safety records were talked through from all angles; schemes for preventing trivial accidents; benefit funds for employees; doctors and nurses at cement plants; resuscitation, and similar topics engaged the attention of these safety men. Every one of them contributed and every one of them went away with more than he gave. It is that spirit of frank discussion in which personal diffidence gives way to a desire to help that has been largely responsible for the enviable standing of the cement industry in accident prevention work. So enthusiastic have the safety committees of cement mills become that they do not even stop with the work in their plants but go out and help to impress the need for this work on the public at large. Some mills have open safety meetings in which the safety problems of the public are also considered.

Continuation of the Work

One of the most sincere tributes that any group of men can give to one of their fellow workers was tendered to H. G. Jacobsen on the occasion of his severing his connections with the Association. An item on this subject will be found in the "Men and Mills" section of this issue.

A. J. R. Curtis of the Portland Cement Association, who will continue the work so efficiently carried on by Mr. Jacobsen, addressed the cement section. He spoke of his surprise and pleasure in seeing such an enthusiastic meeting. He compared accident prevention work with sales work, saying that the safety man has an idea to sell to his fellow workers. Sales and advertising methods must be adopted to put the safety idea across and it is necessary to keep at it everlastingly. He made a plea for material for the Accident Prevention Bulletin and suggested that its

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The Relationship Between Physical Examination and Accident Prevention

A Paper Delivered at the Cement Section of the Fifteenth Annual Safety Congress—Industry Must Follow Lead of Universities, States and Federal Government in Physical Examinations—How the Riverside Portland Cement Company Reduced Accidents by Making a Physical Inventory of Their Force and Thereby Helped Themselves and Their Employees

By **EUGENE T. GREEN**
Insurance and Personnel Department, Riverside Portland Cement Company, Los Angeles, Calif.

A FEW weeks ago, in the city of Philadelphia, some 130,000 people turned out to witness a prize fight which resulted in the crowning of a new champion. Youth was served that night. A young man who had previously passed a successful physical examination for service in the Marine Corps of the armed forces of the United States became a public idol. His success is primarily and directly attributable to the fact that he entered the ring a perfect physical specimen of humanity. Obviously he was physically a better man than Dempsey. A few hours before he won the heavyweight championship he was obliged to undergo a thorough physical examination, which the legislature of Pennsylvania in their wisdom declared should be a prerequisite whenever such contests are held. The legislature of nearly every state requires both principals to a boxing contest to first undergo a thorough physical examination, which accounts for the fact that in the prize ring these days we rarely hear of a serious injury.

Not long ago I witnessed a football game on the Pacific Coast, and during the four quarters of play not one man on either team was injured seriously enough to be taken from the game. Sporting authorities agree that football taxes more severely the physical endurance of the contestants than does the prize ring, and after witnessing this game the thought immediately occurred to me that the fact that these men were in such excellent physical condition made it possible for them to engage in such serious physical encounter without resultant injury to themselves.

Before any man qualifies on the football teams of the big universities these days, he is first subjected to a thorough physical examination to determine his ability to withstand the punishment to which his body will be subjected.

The first qualification for military duty in any of the armies of the world is the ability to pass a physical examination.

Physical Examinations in Industry

It therefore seems appropriate that industry should give some thought to this subject when it has been shown the way by the great universities of this country, by the War Department and by the legislatures of our states.

The time shall come in industry when certain fixed standards of physical condition must be realized. There is just as much reason to require a high degree of physical perfection as there is to demand of an applicant that he be possessed of intellect or skill.

We have reached the conclusion at our plants in California that the higher we maintain the physical standard of our personnel the more gratifying will be the results we are attempting to obtain in the matter of accident prevention. I have therefore come to this meeting to urge the necessity not only of a physical examination when an employee enters the service, but, likewise, repeat that examination during each succeeding year of his employment.

A few months ago we conducted a thorough physical examination of our employees, and as a result of those examinations we have come to the conclusion that fewer accidents should be expected from any industry employing men who are selected through that medium than from an industry that entirely disregards the physical status of the men taken into their organization, and who select their men at random. When this practice becomes universal I believe fifty per cent of this accident prevention problem will be solved. In any event, it occurs to me, some drastic measures must be employed to mitigate the thousands of accidents that occur yearly in the industries of the United States. I am not convinced that any lasting good can come from relying solely on mechanical safeguards and the distribution of accident prevention propaganda.

It occurs to me that those of us who are engaged in the vocation of the conservation of human life have paid far too much attention to the theory of constructing mechanical safeguards and appointing committees to watch out for the welfare and safe conduct of our men, and in spite of all these precautions and thought and study, we are still faced with the proposition that our efforts have been only in part rewarded, for safety in the industries of the United States still leaves a great deal to be desired.

A Physical Inventory Made

In the hope that we might accomplish something toward arriving at the cause of these accidents, we have, during the past six months, devoted considerable time and thought toward ascertaining what physical defects exist in our personnel. We somewhat disregarded for the time being the effect and concentrated more attention to the cause. By the effect I mean we subordinated the installation of mechanical safeguards for another method by which we sought to reach the cause.

During the past year accidents which seemed entirely preventable and wholly unnecessary continued to occur. Within a short space of time three deaths occurred at our plant under such circumstances and conditions that we became convinced that a physical inventory of our employees should be made. A man died at the steering wheel of his automobile upon his arrival home after completing the day's work in our plant. A machinist expired while sitting on the work bench in our machine shop, after he had set aside an acetylene torch which he was using. The coroner found an enlarged heart. A man was sent to fuel an engine and while sitting astride the water jacket fell to the concrete pavement and suffered a fractured skull.

Having been confronted with accidents of this sort, we felt the time had come when we should take a physical inventory of our men and determine whether or not certain pathological conditions existing in them might not be responsible for accidents of this sort.

Complete Examinations Made

With that end in view we caused to be prepared a physical examination report which we thought was an improvement on other reports which were obtained from large industries and life insurance companies on the Coast. Our report recited the name of the man, the department in which he worked, length of time employed in that class of work, and then obtained a thorough family history of his antecedents. We further obtained a complete history of all the accidents and illnesses which he had suffered during his life. With that history we proceeded to the physical examination of every employee.

The necessity of such a report is very obvious. It is pertinent to know whether or not certain ailments which exist might not be directly attributable to some former accident or illness, or, perhaps, be congenital in their origin. We felt we were entitled to know whether or not injuries sustained elsewhere might not be responsible for physical defects which we found.

Before a man is hired by us for any service, he is first subjected to a more or less thorough examination. However, our plant has been in operation for fifteen years, and no subsequent examinations were ever made, so, up to a few months ago we had many men in our service of whose physical condition we were entirely ignorant.

Accordingly, two very capable physicians were employed to look over every employee on the job. To my mind the most essential thing for a comprehensive physical examination is the opportunity of the examiner to examine the patient stripped. One physician made a thorough test of the eyesight, hearing, throat, teeth and tonsils, and then directed the men to the chief examiner who went over them from chest to feet. In addition to this examination we required every employee to submit to a blood Wasserman for syphilis, and unfortunately we found in the personnel of two cement plants over ten per cent of our employees were afflicted with syphilis in some form. While it is true that most of these positive Wasserman's came from the Mexican element, it also happens that the Americans were well represented.

What the Examinations Revealed

We found a man with syphilis was running an engine who only a few weeks before had been subjected to dizzy spells while handling the throttle of that engine. He had in his charge the lives of several men and somewhat over one hundred thousand dollars in plant equipment. We found a syphilitic crane operator whose any act of omission could snuff out the lives of other men. We found one kiln burner who was color blind and who could not distinguish blue from vermilion. His work required him to be in the vicinity of fuel, gas and water lines, all painted a distinct color. In an emergency such as a fire he probably could not distinguish between a fuel line and a water line were he required to put out that fire.

Over fifteen per cent of our men have actual hernias and over fifty per cent potential hernias. A potential hernia is one which will become actual if the workman so afflicted attempts to lift a heavy object when he is not balanced. To avoid the possibility of actual hernia he must always have both feet on the ground in such a position as to centralize any strain which may come upon the abdominal muscles.

Out of some seven hundred men examined we found twenty-six hundred defects, which means that on an average, four defects exist in every employee on the job.

Effect of Imperfections

Now, as to this subject of accidents occurring to these men of physical imperfections:

We must agree that a man who has syphilis does not have the coordination of mind and body that a normal healthy employee is possessed of. It was observed in many of the ten per cent of our employees who are syphilitic, that many of them had been injured under circumstances for which no reasonable explanation could be given, or else they contributed in some manner toward the injury of someone else. Syphilis is not a germ as we term germs in the popular sense, but rather an infection of the blood stream. When observed under the microscope these spirochetes of the blood stream are a multitude of black, spiral worms. The blood supply of a body so polluted first attacks the tissues of the brain, next the central nervous system and finally the means of locomotion. A mind cannot remain alert and at the same time undergo the destructive ravages of syphilis. The very fact that the official statistics of the state of California show that seventy per cent of the inmates of our state institutions for the insane are afflicted with this condition should be evidence enough of the wisdom of that statement.

We found a great tendency toward throat trouble and pyorrhea among the men. It is well known that a pus accumulation in the tonsils or around the teeth causes focal infection. The kidneys and the bladder are required to absorb this infection, and any man whose system is fighting the effects of such a condition is not the same alert, efficient employee he would be if that condition did not exist. His mind is sluggish, his movements are sluggish, for the very simple reason that his vitality is being dissipated.

Safeguards or Examinations?

I am willing to admit that there may be all this necessity for mechanical safeguards, safety committees, bulletin boards, posters and what not to keep such a man eternally vigilant for his own safety, but I do not admit that all these mechanical precautions, these coats of armor we equip our workmen with and all this accident prevention propaganda will play such an important part in our work if it can be arranged that we may deal with more men whose minds are alert and whose muscular movements are not impaired by a toxic poisoning. This argument is not intended to prove either the worth or the worthlessness of the safety device, for we have expended many thousands of dollars in their installation, but rather, to suggest that in a broad sense any physical means to promote safety has its limitations. It cannot be denied that the most insecure thing in the world is a feeling of security.

Large industries everywhere are spending thousands of dollars each year in training first aid teams, in the installation of safety devices and mechanical safeguards and with the exception of a few, no thought whatever is given to the removal of causes which all too frequently make these installations necessary.

In the last analysis, the human body is nothing more or less than a piece of machinery. It functions efficiently only so long as we keep it in good working order. The same thought and attention should be given the repair and upkeep of our body that we give to an internal combustion motor. We would not think of driving an automobile more than a year without grinding the valves, adjusting the carburetor, and tightening the brakes. By doing so we should have prolonged the life of that motor and, incidentally, perhaps, have prolonged our own life. The bodies of men are often subjected to a strain even greater than is a piece of machinery, and sometimes those bodies are more sadly abused. An annual inspection of the mechanism which enables us to be on the job and contribute something toward civilization and society should be just as much in order as the annual inspection we give the boilers around our plant and the motor cars we drive.

The Plant Physician

I cannot help but feel that the one person who can do more than any other mortal toward the prevention of accidents in industry, has been entirely forgotten and overlooked, except after the accident occurs. Every plant should enlist the assistance of the plant physician, not only when a new employee comes to work, but also every year while that employee remains in the service, he should have a physical examination. Such defects as are found should be remedied before they become serious, before they put a man in such a physical condition and mental frame of mind that he becomes a target for an accident.

This apprehension which employers feel toward the reaction of their employees when they ask them to submit to a physical examination is without foundation. Our men met this request with enthusiasm, and when recommendations were made to them by our doctors for the care of their health and the correction of conditions and habits which existed, these recommendations met with wholehearted response.

We have a benefit fund for our men to which each employee contributes in proportion to his earnings. This fund entitles the men to hospital and surgical care when they are ill or sustain injury outside the scope of their employment. This fund has been in existence over ten years, and a reserve well into four figures has accumulated. The men realized after these examinations were made that the entire amount they had accumulated could quickly have become dissipated if certain chronic conditions which were found were permitted to continue uncared for.

Employees Co-operate

We have been asked whether or not our employees objected when we required them to submit to a blood Wasserman. There was not one protest, so you must realize that men these days are concerned about such things, and thinking men everywhere have come to the conclusion that there should no longer be any mystery about this affliction, for there is no scientific data about its acquirement to justify the odium which befalls its victim.

Many people guilty of no moral transgressions whatsoever are numbered among its victims. In cases where we found that condition, we obtained for the men a reduced medical rate and they receive treatment for this condition at cost. While they continue in their efforts to rid themselves of their affliction they may remain in our employ.

The whole success of this periodic physical examination depends upon the assurance of the employer to his men that he is actuated primarily for their own welfare and in that he must be sincere. If defects are found which warrant a change of jobs, the change should be made. Men should be placed at work which their physical handicaps and limitations permit them to do. However, the whole scheme will collapse and fail, if it is used as a weeding out process, and its purpose will be defeated if these measures are resorted to. There should be no necessity in any well organized plant to follow that procedure. Secondly, the men owe a duty to their fellow workers. Third, is the desire of the company to keep its employees in such physical shape that they may be able to work steadily, and their efficiency not be impaired. Finally, the frequency of accidents is lessened.

We have not had sufficient time to observe all the benefits which we believe will be manifest by this periodic physical examination, but my thought in urging this practice at this meeting is in the hope that you will take back with you to your plants the experiences which I am relating. Our physical inventory was made at some expense, but we have already been more than fully repaid for that expenditure.

I cannot help but feel that our men are representative workmen in industry and that the alarming number of defects found in our personnel will not only be our experience but will likewise be your experience.

Conclusion

In conclusion, may I hope that at the next meeting of the National Safety Council others of you from the cement plants of the United States will come here and tell us of your experiences in accident prevention work, by a periodic physical inventory of your men. Give serious thought to the advantages obtained by enlisting as your greatest sentinel of safety, the plant doctor. Not after some crushed and broken piece of humanity is carried from the mill, some fellow whose physical condition was such before the injury that he could not think when danger confronted him, but rather enlist the help and good service of the plant physician every day of the year. Keep these men in shape so that when the alternative comes of their ability to think or to take the count, they will not be needlessly handicapped by physical imperfections.

At every cement plant physical testers are employed. It is their duty to test cement for its tensile and compressive strength. We employ them because we realize that the first consideration in the use of cement is its factor of safety. The very word "cement" is symbolical of this thing we call safety. Therefore, safety should be the first consideration for the men engaged in that industry. When defects exist in our product its function as a factor of safety remains in doubt. By the same token, when physical defects exist in the men identified with that industry, they constitute a great hazard to themselves and to their fellow workers. If we are convinced that we owe a duty to the user of cement by subjecting it to these physical tests, then we also owe the same duty to society, by ascertaining whether or not the physical condition of our men is such as to make them a menace to industry, to their fellow workers, or to themselves.

Two of England's most modern cement plants will be described and illustrated in the January Mill Section.

Accident Prevention from the Viewpoint of an Executive

A Paper Presented at the Cement Section of the Fifteenth Annual Safety Congress at Detroit—A Review of Earlier Safety Meetings—Importance of Accident Prevention Work—The Executive's Place in the Work—Experiences of the Alpha Portland Cement Company

By G. S. BROWN
President, Alpha Portland Cement Company, Easton, Pa.

IN October, 1916, ten years ago, I presided as chairman of the Cement Sectional Meeting held under the auspices of the Fifth Annual Congress of the National Safety Council at the Hotel Statler in this city. At that meeting there were fourteen present, including myself, and in looking over the minutes the other day I noticed that in my concluding remarks to the Section, I said that I hoped I could be with you again some day. That Cement Sectional Meeting was the second one, the first having been held in Philadelphia the preceding year. At the time I accepted the invitation to address you at this time, I did not realize that ten years had passed since I had attended one of these meetings, nor did I anticipate when I then said I hoped to be with you again some day, that so long a period would elapse before it would be possible for me to be present. I appreciate the honor implied by your invitation to speak and am very glad to be present.

When I look over the group that has assembled here today and compare it with the few representatives who were present ten years ago, I am impressed, as in no other way, by the increase in interest on the part of the cement industry in the protection of its employees from the hazard of their occupation.

You gentlemen, who are on the "firing line," so to speak, undoubtedly regard the subject of accident prevention as a somewhat abstract proposition and find it difficult at times to keep an active interest in this particular subject, when you have so many other matters pressing on you for attention—matters which are apparently much more important, in that the prosperity of your organization depends upon continuity of operation and economy of procedure in your plants. Nevertheless, in spite of this drawback, progress has been made in the cement industry in reducing accidents.

Accident Work Important

What I would like to do is, if possible to bring some message of encouragement to you men who are working continuously to reduce accidents in the cement industry. My interest in this matter changed from the sentimental to the practical about 1910 or 1911, when the first compensation laws were being discussed by the legislatures of New York and of New Jersey. As I recall it now, the first law was passed by the state of New York and was later declared unconstitutional. This was followed by the enactment of a law in New Jersey which passed the constitutional test, and thereafter New York passed another law which also was declared constitutional. Since that date nearly all of the other states have passed compensation laws.

As a result of the passage of these early laws, a determined effort on the part of the management of the Alpha Company to reduce the number of accidents about its plants was begun. Our work at first was more or less intermittent, but the fact that I, during the years from 1911 to 1915, was in close contact with the operation of the plants of the company, brought home to me in a very emphatic way, the real importance of accident prevention work, and as time went on, I gradually came to see that no effort that we could make to prevent the maiming and killing of our workmen was too great or costly to be tried. While I no longer have the close contact with the operations of our plants that I had in those years, I still have the same active interest in the accident prevention work of our own company and of our industry, and it is a matter of pride with me that not only have the efforts, which the Alpha Company made, had a measure of success, but the work of the Accident Prevention Committee of the Portland Cement Association has also been successful.

Effort Repaid

Many different methods have been tried by the company that I represent and by other companies in the industry, to stimulate the interest of the men themselves in this work. When we first started work, the greatest stress was laid upon the protection of machinery. I was very soon convinced that by far the major number of accidents about our works came from the carelessness and neglect of the individual who was hurt, or of some fellow employee, rather than from unprotected machinery. Therefore, while we continued to follow the suggestions of the various state commissions, as to the protection of machinery, we felt that our real job was to get the co-operation of our employees themselves, and that has been our effort for the past ten years. Frankly, it has been discouraging at times to see, in spite of all that we have attempted to do, after the final figures are made up and a review of the results for the year made, we at times seem to have gone backward. In recent years, however, I feel that we, as well as the industry, have made real progress. Shortly after the first of the year we made a careful study of the accident records of the Alpha Company and were far from satisfied with the result. We had, we thought, impressed the executive force with the sincerity of the president and the directors in regard to this work, but evidently they had not gotten that fact across to the employees.

The Bonus Plan

I came to the conclusion that perhaps a monetary reward would stimulate the interest and enthusiasm of our employees, and after careful consideration by the management and consultation with the operating officials of our various plants, the Alpha Company established what we call "The one per cent safety bonus plan." Without going into all the details of this plan, it is sufficient to say that, if a mill has operated for a month without lost time accident, the employees of that plant are entitled on each pay day, so long as the plant goes without a lost time accident, to an addition of 1 per cent of their earnings, as shown by the pay roll. We are much pleased with the results so far. The lost time accidents for the first nine months of this year at the various plants operated by us aggregate 40; the lost time accidents for the same period in 1925 were 94. The number of days lost during the same period in 1926 was 855, and in 1925 there were 1539 days lost. The days lost per one hundred thousand men hours worked for the first nine months of 1926 aggregate 48, while for the year 1925 the number of days lost per one hundred thousand man hours worked was 494, which includes an allowance for four fatalities. We have been extremely fortunate up to date this year, in that we have had no fatal accidents.

Whether this safety bonus will, in the long run, continue to bring good results, time only can tell, but I am convinced that it has brought about a much greater degree of co-operation on the part of our management and employees than has been known in our organization heretofore. This attitude was well expressed by one of our superintendents who, in an address to the employees under his supervision, said, "When the company not only asks us to be careful but is willing to pay us for looking after ourselves, we certainly ought to comply with its request."

Executives Interested

I have touched upon the value of co-operation and I think that we may say that our industry has succeeded in getting not only a fair measure of co-operation on the part of the workmen, but in many instances, on the part of the management of our plants. Nevertheless, there is, it seems to me, still lacking in many companies that full measure of interest and co-operation on the part of the chief executives which they should have. These men, in my judgment, should give more hearty and continuous support to the efforts of those who are charged with the actual work of educating our employees to safety methods. I speak from the standpoint of the chief executive of an organization, but I am sure that many of you present are executives also, although it may be in a subordinate capacity, and I want to urge upon you most emphatically, complete and thorough co-operation on your part with the efforts that are being made in your plants for the prevention of accidents. I think there can be no truer statement made than this, "The attitude of the management will determine the attitude of the employees." If the attitude of the management is that of carelessness or intermittent attention to this particular problem, you can hardly expect workmen to have any other than the same viewpoint.

If, on the other hand, the management takes a personal interest in these efforts, if it shows that it is willing to spend money for the protection of machinery and the education of its employees, it can expect a hearty response from these employees.

Competition Beneficial

It is well known that competition is one of the strongest incentives that men can have, and this incentive in recent years has been used to great advantage in our industry. The trophy of the Portland Cement Association is being worked for by the individual mills of the organizations, which compose the association, with much interest, and, as the competition goes on, I think I can see a distinct increase in interest on the part of our mills. The offer of the trophy by the Bureau of Mines in 1925 called "Sentinels of Safety" was productive of great interest. The publication of the safety records by the press is of much value. Nothing is more conducive to the morale of a plant than to find that it has been mentioned by the press as having done well in some particular or over a specified time.

Fatal Accidents

The fatal accident in our industry is our most serious problem. It is true that a permanent injury is also of serious moment, but the majority of those who receive permanent injuries are still able to earn their living, to care for their families and enjoy life. The fatal accident, however, removes from the family its wage earner; it takes from him the probable enjoyment of many years of life; it results in the disorganization of the home and the lack of education for the children, or makes it necessary to call for help from those charitably disposed. These are the practical results, but it also causes that great sorrow which the death of a loved one always brings to those who are in his circle of friends. The latter is a thing for which no adequate compensation can be made and the report of a fatal accident is the most distressing one that can come to me as the chief executive of our company. Every effort, therefore, should be made to prevent fatal accidents and as we are successful in such efforts we may count our whole campaign successful.

Tribute to Jacobsen

I cannot close this rather informal address without expressing my regret that Mr. Jacobsen, who has so long served as the Manager of the Accident Prevention Bureau of the Portland Cement Association, is about to sever his connections with it. While I did not have the pleasure of working actively with Mr. Jacobsen, I have watched his efforts with a great deal of interest and have been much impressed by the success which he has obtained. His ability to go into the various plants of the members of the organization and work harmoniously with the management there has been an outstanding feature. I am sure that you will all join with me in wishing him success and prosperity in whatever new venture he may undertake.

Potash Survey

Washington, D. C.—The federal government's search for domestic supplies of potash of sufficient extent to render the United States independent of foreign producers of this essential material will commence in Upton county, Texas, the bureau of mines announced October 12. The area officially selected lies in the northwest corner of section four, William Teer survey, and centers about the Dixie Hughes No. 1 oil well.

This location was recommended by the geological survey. The depth to the top of the potash-bearing salts is 435 feet. The total depth recommended for test holes is 1,300 feet. Mineralogical examination of a series of cuttings shows three horizons of excellent polyhalite. Any point within a radius of two miles from the Dixie Hughes No. 1 oil well is regarded by the survey as favorable for potash exploration. Alternative sites for the drilling of test holes have been designated.

Favorable Progress Made by New British Cement Company in First Year

At the first annual meeting of Eastwoods Cement, Ltd., the important new British cement manufacturing enterprise, the first year's progress was reviewed. Horace Boot, M. I. C. E., M. I. M. E., M. I. E. E., the chairman, presided. At the statutory meeting a year ago Mr. Boot outlined the firm's scheme for the construction of a modern cement works with British plant, labor, and capital.

The firm's property consists of 151½ acres of the finest cement marl at Barrington, Cambridgeshire. It includes a manager's house and buildings, and also the works' sidings which have recently been completed. Expenditure to March 31 last, apart from the purchase of the property, was purely nominal, as, of course, the heavy plant and machinery was then under construction in the works of the various contractors and had not been paid for. Practically the whole of the plant is now on the site and erected or in process of erection.

The figure of cash and government securities is the substantial one of approximately $500,000. By judicious investment of the capital in securities which could be readily realized, the directors have been able to maintain the strength of the liquid assets during the concern's first year, and at the same time to earn a substantial contribution to the profit and loss account. The year closed with a credit balance of £652 ($3,260) brought in from profit and loss account, which is an unusual feat for a company in its first year—and not a full year at that. The concern was able to begin trading immediately on taking over the property. Part of the surplus land was let, and a kiln was started to provide lime both for sale and for the works buildings. These and sundry other trading receipts bring the total up to about $10,000.

The kiln, which is 200 feet long, is nearly erected. The drying mill and coal-grinding mill are delivered on the site, the two large slurry mixers and the three washmills are completed, and the powerhouse is approaching completion. The boilers, economizers, stokers, and chimney shaft are erected, and in the engine house the 1,000 k.w. turbine is erected, as well as a week-end turbo-alternator set, with their respective condensers.

The London & North-Eastern Railway granted facilities for the firm to pass traffic over its system on to the Barrington Railway, which connects the cement works with its main line between Hitchin and Cambridge. Many parts of the machinery weighed up to 40 tons in one piece, and these were handled dexterously by the railway staff without accident or mishap.

Owing to the general strike, and subsequently to the coal strike, difficulty has been experienced in getting the necessary steel. Assuming there are no further delays cement making should be commenced early in 1927.

During the year the directors had the opportunity of acquiring on very favorable terms, with option to purchase, the lease of a lime works located within a few miles of the cement works, and, as today there is a great shortage of lime, they decided to start working. The quality of the material and the advantages possessed by the company, and considering the exceptionally low capital outlay, are such as to ensure the company a prosperous future. The advisability of increasing the plant by a further kiln will very shortly have to be considered. This kiln would bring the production up from 1,000 tons per week to 2,000 tons per week. The consulting engineers, in designing the works, have already made arrangements for the extensions, and, for a comparatively small increase in the capital outlay, the output for which the works are at present designed can be doubled.

Power Plant and Kiln Design

(Continued from page 100)

Study of Charts

The extent to which the study and application of the results are carried will determine the efficiency of operation, not only in the power production, but in the operation of all departments of the plant. A careful balance of power production and manufacturing rates throughout the plant are essential to obtaining the most economical results. Power must be considered in planning operating schedules. In a well designed, modern plant some excess power will be available over that required for balanced operations. This excess, however, is small in comparison with the total usually required for grinding the winter's accumulation of clinker. Some clinker may be stored during the winter months and ground during the following summer with the excess power. This may be done by increasing the summer grinding rate by 20 to 30 per cent beyond the normal balanced conditions.

The efficiency of power generation and the kilowatt hours per barrel of clinker ground will have a marked effect upon the amount of excess clinker which may be handled with waste heat power. A falling off of grinding efficiency in the raw and finish departments may readily upset the balance and reflect a power shortage. If this deficiency is made up by purchased power or power generated from additional fuel the net result is an increased cost per barrel which may be avoided.

The successful utilization of waste heat power is intimately connected with the operating efficiency of each department in the plant. If the investigations are carried to their ultimate conclusions the general effect will be quite beneficial in increased production and reduced costs at points where inefficiency or high costs were not suspected.

Safety Meeting

(Continued from page 101)

circulation among mill men ought to be increased substantially. He closed with an eloquent appeal for the continued co-operation of the mill safety men with the Accident Prevention Bureau of the Association.

Joint Session

The following day, October 27, the cement men and the quarry men met in joint session. This session was presided over by E. E. Evans, chairman. Dr. R. H. Lansburgh, Secretary of Labor and Industry for the state of Pennsylvania, presented a much discussed paper on the subject, "Safety in the Cement and Quarry Industries." He also complimented the cement industry, saying that "it is the most nearly completely organized for safety in the United States." Accidents, Dr. Lansburgh said, are due to five causes: explosives and explosions, cars and engines, falling objects, falls of persons, and handling materials. Under these heads he discussed the causes and preventive measures.

The subject of the use of lifelines in quarries and bins came in for a great deal of discussion both after this paper and in the round table discussion following.

A paper, "Crane Cables," was read by H. L. Williams, consulting engineer of the Williamsport Wire Rope Co.

The joint session ended with a most interesting round table discussion on the following subjects:

(a) How to protect workmen with regard to storage bins.

(b) Protecting the individual versus guarding machinery.

(c) Advantage of inspection trips to all operators on each stone outcropping.

MEN and MILLS

Notes from the Field

New Cement Plant for Georgia

Georgia Portland Cement Corporation Capitalized at $3,000,000

Local Interests Form New Southern Cement Company; Headquarters at Augusta

The Georgia Portland Cement Corporation, capitalized at $3,000,000, has been organized and will start operations in the near future, it has been announced. The plant will be located near Sandersville, Ga., and will be designed to manufacture 1,000,000 barrels annually, with a daily output of about 3,000 barrels. Offices will be at Augusta.

Local capital is largely interested in the undertaking, and the following Augusta men are the officers: J. Lee Hankinson, president; John C. Hagier, vice-president; H. T. Neill, treasurer, and J. C. McAuliffe, secretary. T. L. Tarjan and Company, Chicago, are to serve as fiscal agents.

Formation of the corporation has been in progress for the past ten months, preliminary surveys covering the work having been carried on under the management of a large eastern mining engineering concern. The company has acquired extensive real estate holdings in the region, including limestone, clay and shale deposits. H. K. Ferguson and Company of Cleveland, Ohio, are the prospective engineers for the plant.

New Yosemite Plant in California

The Yosemite Portland Cement Company announces that construction is under way on a new plant at Merced, California. The MacDonald Engineering Company of Chicago has the contract for the concrete bins; the Allis-Chalmers Company will furnish two 10x240 kilns each, and machinery for four grinding mills, two raw and two finish, with four 500 h.p. motors.

Officers of the Yosemite Company are A. E. Wilson, president; W. A. Southerland, vice-president; Murray Bourne, secretary, and A. Neil Jacobs, treasurer.

Completion and full operation has been promised for early spring.

Construction of two smokestacks, 200 ft. high and 10 ft. in diameter, on the nearly completed plant, and of 65,000 barrel storage bins, will be started at once, according to G. A. Fisher, manager of the plant.

Affleck a Reformed Organ Pumper

Benjamin F. Affleck, the genial president of Universal, says the Chicago *Daily News*, in a recent story, has admitted being a member of the Guild of Former Pipe-OrganPumpers, loft number 1, one of the most exclusive fraternal organizations in the country. The Guild was formed a few weeks ago, following the publication of an article in a weekly magazine, by Chet Shafer, a New York writer. Many of the nation's greatest, remembering that they, too, had perspired Sunday mornings and Sunday nights for a pittance that looked, in those days, like a fortune, joined themselves in bonds of brotherhood. Mr. Affleck suggested that the membership dues be made the weekly remuneration from the home-town church in days gone by, and forwarded his check for 35 cents. Since no dues were provided for, however, his check was returned.

Forty years ago, Mr. Affleck admitted, he was the organ pumper in the First (and only) Presbyterian Church of Belleville, Ill. His duties consisted of going to the church on Saturday nights for rehearsal, and for the regular Sunday services, and pumping with might and main to keep the organ going. The salary was 35 cents a week, straight, with no overtime. The operation of the organ bellows handle was quite the same as working a hand car. It meant leaning over and pulling up a large wooden bar, thereby filling the bellows with air. Wonderful exercise, he testified, it would be for gentlemen cursed with obesity.

S. D. State Plant Figures Published

Among the state-owned business enterprises, one of the most favorable reports is that of the cement plant at Rapid City, South Dakota. The state report for the first half of 1926 shows an undivided profit of $118,200.25, according to official figures recently made public.

An independent study of the figures made by a local newspaper accountant, however, brings the undivided profits down to $90,996.94. According to accounting methods, the items of shutdown expense, and the anticipated recovery from cash in closed banks, which in all amounts to a sum of $27,203.31, should be deducted from the undivided profits. Interest on outstanding bonds amounts to $154,050, making the total operating loss to the state for the half year $63,053.06.

Influence is being used to transfer the plant books to the state capital at Pierre, to insure proper accounting, it is reported.

Marquette Band Tours Dealers' Towns

Plant heads and dealers are sending in favorable reports in the wake of the musical promotional work of the Marquette Cement Manufacturing Company, LaSalle, Illinois. A twenty-six piece band composed of the employees of the firm fills engagements at various broadcasting stations, appearing under the auspices of dealers selling Marquette products.

Sandusky Cement Company Puts Band on Air

A series of nine radio concerts, the first of which took place October 28, is being sponsored by the Sandusky Cement Company, Cleveland. The Medusa makers have secured the Cleveland Symphony orchestra as the feature of these programs, which are broadcast from Station WTAM and are making use of the opportunity by broadcasting as well as distributing printed programs to the public.

Penn Dixie Cement Declares Dividends

Penn Dixie Cement Corporation directors have declared an initial dividend of 80 cents on the common stock and an initial quarterly dividend of 1¾ per cent on the 7 per cent cumulative preferred stock.

Some old mill stones at one of the earliest American cement plants. These old burr-stones were once used for grinding raw materials and clinker—quite a contrast to the efficient grinding machinery of today

Cement Mill Safety Men Pay Sincere Tribute to Jacobsen

No more sincere tribute of affection and appreciation of a fellow worker can be given than that rendered to H. G. Jacobsen at the close of the Cement Section meeting of the National Safety Congress in Detroit. This was "Jake's" last meeting with the men he had labored with for so many years as manager of the Bureau of Accident Prevention and Insurance of the Portland Cement Association. Throughout the meeting there were expressions of regret that he was leaving the work to enter the employ of the Bates Valve Bag Company. As a token of their appreciation the safety men presented him with a white gold watch and, more important than that, with a testimonial, the text of which is given below:

"Upon this, the occasion of your departure from the service of the Portland Cement Association, we, the undersigned, representatives of the affiliated companies, desire to express to you our utmost regard and heartfelt appreciation of the splendid work you have accomplished during the years of your identification with their Accident Prevention Bureau.

"No man can consecrate his life to a more glorious cause or calling than that of the conservation of human life and the prevention of accidents. Your work during the years of your identification with the Accident Prevention Bureau of the Association will ever stand as a living monument.

"You have likewise enabled us to accomplish great things in the conservation of the lives of our men and we reconcile ourselves to your departure with the greatest regret.

"May the same success attend your future efforts and you carry with you our sincerest good wishes and godspeed in your new undertaking."

P. C. A. Annual Meeting Held in Chicago

The Annual Meeting of the Portland Cement Association was held November 15-17 at the Drake Hotel in Chicago, closing with the banquet, November 17.

G. S. Brown, president of the Alpha Portland Cement Company, Easton, Pa., was elected president of the Association to succeed Blaine S. Smith of the Universal Portland Cement Co., whose term expired.

Other officers are: vice-presidents, E. M. Young, Lehigh Portland Cement Company, and R. B. Henderson, Pacific Portland Cement Company; treasurer, J. W. Boardman, Huron Portland Cement Company.

A. J. R. Curtis Named Assistant to the G. M.

A. J. R. Curtis, formerly manager of the Products Bureau of the general office of the Portland Cement Association, has been appointed assistant to the general manager of the Association. Among other duties, Mr. Curtis will continue the accident prevention work of the Association formerly supervised by H. G. Jacobsen.

W. D. M. Allan succeeds Mr. Curtis as manager of the Products Bureau.

Atlas May Move Central States Sales Office to St. Louis

The Atlas Portland Cement Company is reported as contemplating moving its central states sales headquarters from Chicago to St. Louis. A branch office at present is located in the Boatmen's Bank Building for the immediate territory.

While details were not given, it was learned that the order would be reversed between the Illinois city and St. Louis, making the branch office at Chicago and the district sales office at the former city.

The company is incorporated under the laws of Pennsylvania and recently retired $4,000,000 in bonds some time before the date of maturity.

Wet Process Planned for Alabama Plant

Engineering work and plans have been completed for changes in equipment and method of operation at the Alabama Portland Cement Company plant at North Birmingham, a subsidiary of the International System. Specifications call for expenditures of about $500,000, it is said. Work is to begin at once.

Plans include installation of more modern equipment and a change from the dry to the wet-blending process.

While proposed improvements will not result in increased output, higher efficiency of operation will be obtained with marked improvements in working conditions and entire elimination of dust.

Pacific Coast Plant Building New Tanks

The Southwestern Portland Cement Company is building storage tanks at its Victorville plant, in California, with a capacity of 120,000 barrels. The addition will more than double its present storage capacity of 50,000 bbl.

Edison Visits Son's Plant in New Jersey

Thomas A. Edison, living at Orange, N. J., paid a recent visit to the Edison Portland Cement Company plant at New Village, N. J., owned by his son, Charles. He was accompanied in a special train by officials of the Lackawanna Railroad.

Alabama Plants Working Full Time

All Alabama cement plants, particularly those in Birmingham, are reported to be operating full time. House, street and highway construction is said to be using the major portion of the production. Adjoining southern states are also receiving much Alabama cement.

Discuss Imports of Cement

International Sends Coolidge the Facts on European Cement's Intrusion

The president of the United States has been advised that the increased use of European cement produced by cheap labor has the aspect of becoming a major hindrance to American prosperity, in a statement by H. Struckmann, the president of the International Cement Corporation. The statement declares that since 1920 the United States has consumed 10,000,000 barrels of foreign-made cement, with a resultant loss of $29,000,000 to the American cement plants and relevant industries.

The statement read briefly as follows:

"Cement mill labor in Belgium gets the equivalent of 90 cents a day while American cement is made by men receiving five times as much or $4.50 a day. Cheap labor, combined with low fuel cost, has resulted in the production of large quantities of foreign-made cement for export. A great deal more cement than required is produced in Europe for its consumption. In addition, low canal tolls from inland points in Belgium, France and Germany and the cheap ocean freights to America, enable the foreign manufacturer to undersell the American producers.

"The statement is sometimes made that by purchasing its cement we are indirectly helping Europe to get back on her feet. It is important for America to understand, that we cannot help Europe by hurting American business."

With reference to the losses suffered by the various branches of the industry, Mr. Struckmann declared that it will mean better business for American industry as a whole if the cement-consuming industries remember that it is in reality their own customers who are hit every time they buy foreign-made cement. Since 1920 those who have purchased foreign-made cement made an alleged saving of from 15 to 30 cents a barrel, but that "saving" actually cost America $29,000,000 worth of prosperity.

He continued: "The same conditions apply to other heavy commodities which are being imported in large quantities. If the present trend continues it will mean a veritable flood of these products and a real menace to our prosperity. We Americans must learn in time the paramount importance of keeping our money working at home."

California Cement Sales Reports Cheerful

Mr. C. A. Low, director of sales for the Monolith Portland Cement Company, Los Angeles, reports an upward trend in orders for cement, construed as an indication of increased building activity.

Alpha President Urges Tariff Protection

"The tremendous increase in importation of cement since 1919 compared with the unused productive capacity in Pennsylvania indicates the extreme necessity of tariff protection to the industry in this state," declared G. S. Brown, president of the Alpha Portland Cement Company, at Easton, Pa., in a letter regarding the industry to W. L. Mellon, chairman of the Republican State Committee of Pennsylvania.

"The enormous value to the prosperity of the country of the cement industry, due to the great purchasing power of the workman resulting from the high wages received," states Mr. Brown, "has not as yet been given anything like the credit that should be given to it. None of us want to see the rate of pay to labor reduced and I hope that when the time comes representatives of Pennsylvania in Congress will feel the necessity and desirability of obtaining protection for the cement industry.

"Since many years prior to the war, portland cement has been on the free list, but there was practically no competition from foreign cement, because American manufacturers were able to put their product into the consumer's hands for less money than the price asked by European producers for their product delivered into the United States. During the war the cost of producing cement in Pennsylvania increased enormously so that after the war, on the basis of the lower labor cost, ocean freights and depreciated currency, the European producers were able to ship cement to the United States, selling it along the seaboard at a price which would require the Pennsylvania manufacturers to sell their product for less than cost at such points."

October Safety Reports Show Improvement Over 1925

The decided trend toward fewer accidents in the closing months of the year is evident in the Portland Cement Association No-Accident Campaign report for October. Reports from 127 mills show that 73 of them went through the month without accident of any kind. These plants will be entered as "October Honor Mills." If they succeed in keeping a clear record until December 31 their names will be published on the no-accident honor roll to appear in the Accident Prevention Bulletin for March-April.

During October, 54 mills reported 103 non-fatal lost time accidents and three fatal accidents. While this record is a decided improvement over October, 1925, which had nine fatalities, it had been hoped to make October a clean month.

British Engineers Visit Local Cement Plant

Some 50 members of the Northwestern branch of the British Institution of Municipal and County Engineers recently paid a visit to one of the modern portland cement works of G. and T. Earle (1925) Ltd. The works are located at Melton, about ten miles from Hull.

A feature of the Melton works is that the chalk, which is quarried by a steam shovel, is crushed, ground and mixed with water at the quarry. This milky liquid is then pumped through a six-inch pipe to the cement works one and a third miles away. There it is thoroughly mixed with clay from the bed of the River Humber and made into slurry ready for burning. The burning takes place in rotary kilns, the slurry entering at the top end and the clinker leaving at the bottom.

Geologist Finds Largest Gypsum Crystals in Mexico

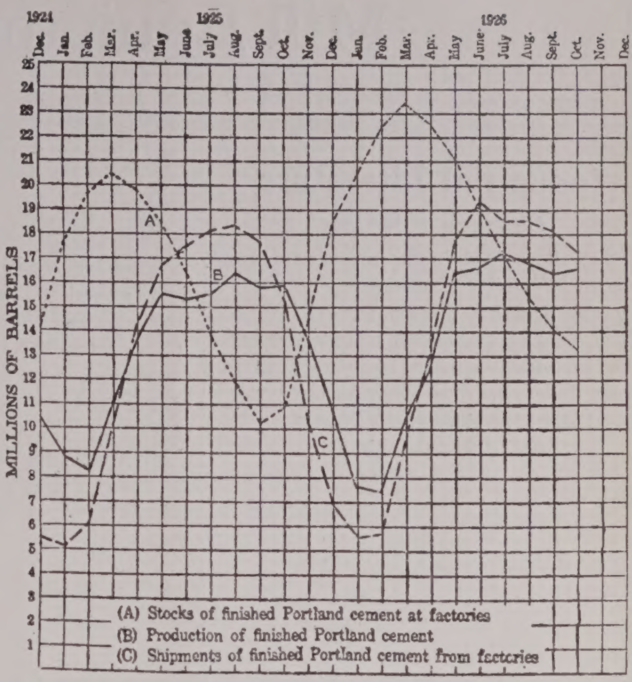
Washington, D. C.—The discovery in Mexico of the largest known gypsum crystals in the world by Dr. W. F. Foshag is announced by the Smithsonian institution. Dr. Foshag has just returned from an expedition to the mining regions of Chihuahua and other states of northern Mexico. Ndica, in Chihuahua, produced the mammoth gypsum crystals which the Smithsonion geologist brought back with him to Washington. The gypsum is found in a cave in the silver and lead mine at Ndica. The crystals measure up to six feet in length and are eight and ten inches thick.

Cement Plant Officials Join Engineers' Club

The following Pennsylvania cement plant officials have recently become members of the Engineers Club of the Lehigh Valley: Ed. M. Brickett, Research Asst., Lehigh Portland Cement Co., Ormrod, Pa.; Henry Culver, Master Mechanic, Lehigh Portland Cement Co., Sandt's Eddy; Louis A. Dahl, Research Chemist, Lehigh Portland Cement Co., Allentown; H. M. Dickenshied, Chemist, Lehigh Portland Cement Company Easton; John F. Frickert, Elect. Foreman, Lehigh Portland Cement Co., Coplay; W. M. Harbaugh, Field Engineer, Lehigh Portland Cement Co., Allentown; Harry M. Hess, Chemist, Lehigh Portland Cement Co., Easton; John Howell, Chief Engineer, Lehigh Portland Cement Co., Easton; Geo. Kauffman, Jr., Asst. Chief Engineer, Lehigh Portland Cement Co., Sandt's Eddy; Fred Lobach, Foreman, Lehigh Portland Cement Co., Coplay; Karl E. Menear, Chief Electrician, Lehigh Portland Cement Co., Easton; R. G. Winters, Electrical Foreman, Lehigh Portland Cement Co., Stiles, Pa.

Cement Statistics for October

PRODUCTION and shipments of portland cement in October, 1926, were the greatest for that month in any year, according to the Bureau of Mines, Department of Commerce. Production was at about the same rate as in September, 1926, and exceeded that of October, 1925, by nearly 4 per cent. While a seasonal decrease is shown in the October shipments of portland cement they were over 14 per cent greater than the shipments in October, 1925. Portland cement stocks continued to decline, but at the end of October, 1926, were over 21 per cent in excess of the stocks at the end of October, 1925.



Estimated Clinker (Unground Cement) at the Mills at End of Each Month, 1925 and 1926, in Barrels

Figures represent thousands of barrels

	1925	1926
January	7,017	9,074
February	8,497	10,931
March	9,962	12,284
April	9,731	12,934
May	9,053	11,649
June	7,937	10,086
July	6,961	8,515
August	5,640	7,362
September	4,561	*6,095
October	4,086	5,387
November	5,013	———
December	6,469	———

Production, Shipments and Stocks of Finished Portland Cement, by Months and by Districts

Figures represent thousands of barrels

Month	Production		Shipments		Stocks at end of month	
	1925	1926	1925	1926	1925	1926
January	8,856	7,887	5,162	5,674	17,656	20,582
February	8,255	7,731	6,015	5,820	19,689	22,384
March	11,034	10,355	10,279	9,539	20,469	23,200
First quarter	28,145	25,973	21,456	21,033	———	———
April	13,807	12,401	14,394	12,961	19,877	22,640
May	15,503	16,472	16,735	17,951	18,440	21,173
June	15,387	16,827	17,501	19,113	16,409	18,900
Second quarter	44,697	45,700	48,630	50,025	———	———
July	15,641	17,096	18,131	18,786	13,896	17,210
August	16,419	16,936	18,383	18,536	11,952	15,718
September	15,939	16,571	17,711	18,087	10,247	*14,195
Third quarter	47,999	50,603	54,225	55,409	———	———
October	15,992	16,596	15,309	17,486	10,979	13,305
November	13,656	———	10,187	———	14,534	———
December	10,713	———	6,917	———	18,515	———
Fourth quarter	40,361	———	32,413	———	———	———
	161,202	———	156,724	———	———	———

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*Revised.

Commercial District	Production—October		Shipments—October		Stocks at end of Oct.		Stocks at end of Sept., 1926*
	1925	1926	1925	1926	1925	1926	
Eastern Pennsylvania, New Jersey and Maryland	3,851	3,986	4,108	4,272	802	2,432	2,718
New York	916	999	977	921	411	674	596
Ohio, Western Pennsylvania and West Virginia	1,700	1,795	1,432	1,668	1,515	2,057	1,930
Michigan	1,171	1,338	1,062	1,385	815	1,015	1,062
Wisconsin, Illinois, Indiana and Kentucky	2,339	2,160	2,014	2,656	2,153	1,296	1,792
Virginia, Tennessee, Alabama and Georgia	1,254	1,430	1,236	1,391	283	1,068	1,029
Eastern Missouri, Iowa, Minnesota, and South Dakota	1,515	1,458	1,434	1,842	1,970	1,609	1,993
Western Missouri, Nebraska, Kansas and Oklahoma	992	1,032	972	984	1,518	1,455	1,407
Texas	429	428	335	444	382	401	417
Colorado, Montana and Utah	270	275	200	252	487	406	384
California	1,189	1,381	1,201	1,359	458	480	458
Oregon and Washington	366	314	338	312	185	412	409
	15,992	16,596	15,309	17,486	10,979	13,305	14,195

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*Revised.

Mill Equipment and News

Industrial Literature

Castings Booklets

The alloys used in the manufacture of *Amsco "Fahralloy"* castings, manufactured by the *Southern Manganese Steel Company,* St. Louis, Missouri, are described in the loose-leaf booklets recently received from that firm. Accompanying the larger booklet is a smaller one, to be inserted in the handbook and containing notes on the selection, design and use of castings for high temperature service.

Steam Standardization

The accomplishment of obtaining really clean and dry steam is announced by the *Andrews-Bradshaw Company,* Pittsburgh, Pennsylvania, in its *Bulletin No. 39,* newly issued. The lack of a recognized standard in common use for steam quality other than "commercially dry" brought upon an investigation and the subsequent standardization by the use of six-stage, low-velocity steam purifiers.

Coal Pulverization

The results of a thorough survey completed early in the year by an investigating engineering organization on the *Raymond coal pulverizer,* are found in an eight-page booklet recently received. The summary claims for this system of pulverizing, the product of the *Raymond Bros. Impact Pulverizer Company Chicago,* that the method saves almost 40 per cent in operating cost, that one operator can handle two mills, and that the shaley coal used causes only moderate repairs.

Speed Reducer Data

"Gear Problems," issued by *Foote Bros. Gear & Machine Company,* contains engineering information on speed reducers, conveying equipment, gears of all kinds, and mathematical tables. As an aid to quick reference it is indexed by subjects in the upper page corners, and has a complete cross reference index in the back.

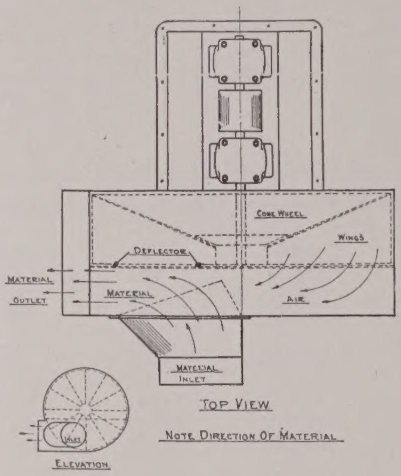
Dryer Information

Dryers and their use in cement plants are described in a catalog issued by the *Ruggles-Coles Division* of the *Hardinge Company,* York, Pa. Descriptions of their construction, dimensions and several installations are accompanied by excellent illustrations and one or two phantom views.

NEW EQUIPMENT

Everlasting Exhaust Fan New Macleod Product

The Everlasting exhaust fan, patented by the Macleod Company, Cincinnati, Ohio, differs somewhat from others in that the material does not come in contact with the impeller. The material is brought through a projected inlet and discharged at right angles. The wheel is protected by a deflector plate. The only duty imposed upon the impeller is the creating of suction by centrifugal force, the air passing the inlet causing a higher suction.



New Bay City Shovel

The Bay City Tractor shovel, manufactured by the Bay City Dredge Works, Bay City, Michigan, has been announced following a period of exhaustive and severe tests. It is the work of John W. Fairbanks, who has previously developed earlier models of tractor shovels.

The Bay City shovel is built around the International McCormick-Deering tractor, which supplies the motive power and provides three propelling speeds. It is equipped with a shovel that makes five bucket trips per minute, and with full length steel crawler treads nine feet long, the tread rollers being enclosed.

The dipper capacity is ⅜ cubic yards water level measure, or practically ½-yard heaped. The machine weighs eight tons and is capable of digging very hard material. Present optional bucket equipment includes shovel, clamshell or backfiller scraper. The shovel is sold and serviced by the International Harvester Company branch houses, as well as by Bay City Dredge Works representatives.

NOTES FROM THE FIELD

New Timken Appointments

Yale D. Hills has been appointed Branch Manager of the Seattle branch of the *Timken Roller Bearing Service and Sales Company.* Mr. Hills was formerly branch manager of the Portland branch. When this branch office was closed he came to the main office at Canton, Ohio, where he has been located until his present appointment.

Mr. R. H. Cross, who held the position of Seattle branch manager prior to Mr. Hills, has been made assistant to Mr. G. C. McMullen, District Manager of Sales, Industrial Division. Mr. Cross will continue to maintain offices at Seattle.

Extension of H. P. Range

The *Link-Belt Company* has extended the horsepower range of *Link-Belt* chain drives available from distributors' stocks from its former scale of ½- to 10 horsepower, in practically any reduction from 1 to 1 up to 7 to 1. The step-up to 15 horsepower is the first change made by the *Link-Belt Company* in the original plan of stock drives distribution.

Chain Belt Addition

The Chain Belt Company, Milwaukee, Wis., has started work on a new engineering building at its West Milwaukee works. The building will house the steel fabricating and assembly departments, drafting room and general contract engineering offices.

This is the third major unit to be erected on the 59-acre West Milwaukee site and is part of the general plan to gradually move the Milwaukee plant to the larger tract. When the engineering building is completed approximately half of the organization will be located at the West Milwaukee works.

The new building will be devoted exclusively to the manufacture of contract engineering work, such as conveyors, elevators, traveling water screens, and general steel structural work.